Carvalho, M.R., G.S. Lim, S.T. Gunner, S.M. Stuber, and J.L. Reveal. 2012. Typification of various western North American species of Juglans (Juglandaceae). Phytoneuron 2012-7: 1–12. Published 15 January 2012. ISSN 2153 733X

# TYPIFICATION OF VARIOUS WESTERN NORTH AMERICAN SPECIES OF *JUGLANS* (JUGLANDACEAE)

**MÓNICA R. CARVALHO**
L.H. Bailey Hortorium
Department of Plant Biology
412 Mann Library Building
Cornell University, Ithaca, NY 14853-4301

**GWYNNE S. LIM**
L.H. Bailey Hortorium
Department of Plant Biology
412 Mann Library Building
Cornell University, Ithaca, NY 14853-4301

**SIMON T. GUNNER**
L.H. Bailey Hortorium
Department of Plant Biology
412 Mann Library Building
Cornell University, Ithaca, NY 14853-4301

**STEPHANIE M. STUBER**
Department of Horticulture
134A Plant Science Building
Cornell University, Ithaca, NY 14853-4301

**JAMES L. REVEAL**
L.H. Bailey Hortorium
Department of Plant Biology
412 Mann Library Building
Cornell University, Ithaca, NY 14853-4301
e-mail: jlr326@cornell.edu

## ABSTRACT

*Juglans major* (Torr.) A. Heller (1904) was superfluous when published as Heller cited *J. californica* S. Watson (1875) in synonymy. As both authors included *J. rupestris* var. *major* Torr. (1853) in their protologues, only by lectotypification is it possible to render *J. major* legitimate. Accordingly we propose (1) a step-two lectotypification for var. *major* on a specific Samuel W. Woodhouse specimen (NY), following the step-one lectotypification by Heller on this gathering, and (2) the lectotypification of *J. californica* on the William H. Brewer (no. 65) specimen (GH) mentioned by Callahan (2008) as the "type." Only in this way is it possible for *J. major* and *J. californica* to be correct when the two are considered to represent different species. In addition, lectotypes are designated for *J. microcarpa* Berland. (*J.L. Berlandier 2459*, US), *J. nana* Engelm. (*F.J. Lindheimer 1178*, MO) and *J. rupestris* Engelm. ex Torr. (*J.M. Bigelow s.n.*, NY). The latter overturns an earlier typification by Wolf (1988) on a specimen not seen by Torrey. *Juglans nana* and *J. rupestris* are synonyms of *J. microcarpa*; all three types were gathered in western Texas. Typification of five Dode names is discussed briefly. *Juglans arizonica* and *J. elaepyren* were recently lectotypified by Mauz (2011); isotypes of *J. subrupestris* have been seen but a holotype has not been located. Lectotypes are designated here for *J. neomexicana* and *J. torreyi*. Isotypes and isolectotypes are reported when appropriate.

**KEY WORDS**: lectotypification, step-two lectotypification, *Juglans*

When Heller (1904: 50) proposed *Juglans major* (Torr.) A. Heller (Juglandaceae), based on *J. rupestris* var. *major* (Torrey 1853: 171), he cited in synonymy *J. californica* (Watson 1875: 349) thereby rendering his name nomenclaturally superfluous when published. Fortunately, the 2006 *International Code of Botanical Nomenclature* (McNeill et al. 2006) states that a superfluous name is legitimate if its type differs from that of the name that ought to have been adopted (Art. 52). *Juglans rupestris* var. *major* Torr. and *J. californica* S. Watson are hereby lectotypified so as to render *J. major* legitimate. This then allows the continued use of both names as they are applied in a wide variety of today's systematic literature (e.g., Kearney & Peebles 1951; Munz 1974; Martin & Hutchins 1980; Hickman 1993; Whittemore & Stone 1997) and non-systematic literature (e.g., Harker et al. 1999; Johnson 1999; Cullina 2002; Fralish & Franklin 2002; Preston & Braham 2002; Thompson et al. 2006; Moerman 2010).

In our attempt to resolve the above problem, we found it necessary to examine the typification of other names. Lectotypes are designated here for *Juglans microcarpa* Berland. (Berlandier 1850: 276), *J. nana* Engelm. (Engelmann 1851: 226), and *J. rupestris* Engelm. ex Torr. (Torrey 1853: 171). Five other species names, all proposed by Dode (1907, 1909) and synonyms of *J. major* or *J. microcarpa* (Manning 1957), are discussed briefly. Lectotypes are designated here for *J. neomexicana* (Dode 1909: 169, 191) and *J. torreyi* (Dode 1909: 169, 194). Two of the other Dode names, *J. arizonica* (Dode 1909: 169, 193) and *J. subrupestris* (Dode 1909: 169, 191), were typified by Dode. *Juglans elaeopyren* (Dode 1907: 247) was lectotypified recently by Mauz (2011).

**Lectotypification of *Juglans rupestris* var. *major* Torr.**

Torrey (1853: 171) simultaneously proposed *Juglans rupestris* (a synonym of *J. microcarpa*, fide Johnston 1944: 436) and its var. *major*, characterizing the species as a shrub or small tree with the leaflets of var. *major* longer and broader ("oblong-lanceolatis" [sic]) than those of var. *rupestris* ("lanceolatis"—compare figs. 15 and 16 in Torrey; see also figs. CCCXXXV and CCCXXXVI in Sargent [1895]). In his protologue, Torrey stated that Samuel W. Woodhouse found var. *major* in "western New Mexico" and Dr. John Milton Bigelow "collected it at the Copper Mines."

The Woodhouse specimen in the Torrey Herbarium at NY was annotated by Torrey "Juglans rupestris β." However, we have not found a specimen at GH, NY, or US that we can associate unequivocally with "Bigelow" and a "copper mine." The available sheets that were gathered by Bigelow are all Texas collections of *J. microcarpa*.

The only sheet we found in the Torrey Herbarium (NY) from the vicinity of a copper mine is an "Ex coll. Geo. Thurber" sheet numbered *702*, gathered 3 Jul 1852. The specimen was collected in Santa Cruz Valley in what is now Pima Co., Arizona, based on the information on the GH sheet, which has "702 / large tree. Sta Cruz Valley / July 1852 / G.T." written by George Thurber. We have also seen two other sheets at NY (general herbarium) dated 3 Jul 1852 that have printed labels entitled "Mexican Boundary Survey." As both Thurber and Bigelow were botanists with William H. Emory on the Mexican Boundary Survey in 1852 (McKelvey 1955) it is possible the "Ex coll. Geo. Thurber" sheet was gathered by Bigelow as stated by Torrey, but given what is on the GH sheet we suspect Torrey simply received the specimens from Bigelow, and 702 is actually a Thurber gathering. Critical to our discussion here is that Torrey (1859: 205) later assigned material from the "Copper Mines" to var. *rupestris* noting that var. *major* "seems to pass gradually into the small-fruit form" of his var. *rupestris*. As stated by Wooton and Standley (1915: 162) the Woodhouse collection certainly came from modern-day Arizona. They also noted that the plant growing in the Santa Cruz Valley of southern Arizona, where the copper mines were located, was a "good-sized tree, not infrequently with a trunk 3 to 4 meters to the first branch."

Torrey's observation of the fruit in 1853 is critical because in the original description of var. *major* Torrey wrote "fructibus subovato-globosis apiculatis leviter sulcatis." He distinguished var. *rupestris* as "fructibus globsus [sic] compressiusculis glanduloso-pubescentibus; nuce longitudinaliter sulcato; putamine creberrimo." As the extant Woodhouse sheet lacks fruit, the fruit of var. *major* described by Torrey could only have been derived from his Thurber specimen, and as Torrey questioned the inclusion of this element in 1859, one might then assume that Torrey himself restricted his concept of var. *major* to the fruitless Woodhouse collection. This may account for Heller's (1904: 50) statement that the "type of *J. major* came from western New Mexico, collected by Dr. Woodhouse." In doing so, Heller effectively proposed the Woodhouse gathering as a lectotype (step-one); here we propose a step-two lectotypification by designating a specific herbarium sheet:

***Juglans rupestris*** Engelm. ex Torr. var. ***major*** Torr. in L. Sitgreaves, Rep. Exped. Zuni & Colorado Rivers 171, pl. 16. Mar-Apr 1853. **TYPE**: **Arizona**. "Western New Mexico," without location or date, *S.W. Woodhouse s.n.* (lectotype, step 1, designated by A.A. Heller, Muhlenbergia 1: 50. 1904, NY! [bar code 00214588], **designated here**. [≡ *J. major* (Torr.) A. Heller, Muhlenbergia 1: 50. 22 Feb 1904]).

As now defined, *Juglans major* var. *major* is found in western Arizona, southern New Mexico, and southwestern Texas south into Sonora, Chihuahua, Durango, and Sinaloa, with disjunct populations ranging from central Texas to central Oklahoma (Little 1976; Whittemore & Stone 1997; BONAP 2011). Other varieties of the species extend its range south to the Mexican states of Michoacan, Mexico, Jalisco, and Guerrero.

**Lectotypification of *Juglans californica* S. Watson**

When Watson (1875) proposed *Juglans californica* he cited no specimens but mentioned Torrey's *J. rupestris* var. *major*, a name associated with at least two syntypes, a Woodhouse collection from "western New Mexico" and a "Bigelow" (actually Thurber) collection from the "Copper Mines" of Santa Cruz Valley in modern-day Arizona (see above). Peter (1876: 1366) considered *J. californica* equal to Torrey's var. *major* in his brief review of the Watson paper, implying perhaps that Watson provided a new name for var. *major*. Rothrock (1879: 249) and Sargent (1880: 42) also cited var. *major* as a synonym under *J. californica*, but later Sargent (1884: 131) assigned both to *J. rupestris*; this latter view was followed by Parish (1894: 345). Nagy (1886: 382–383) considered *J. californica* to be a later name ("*Juglans californica Wats*., später neuerdings als *Jugl. rupestris major* v. Torrey beschrieben" [*Juglans californica* Wats. was described recently for *Jugl. rupestris major* Torrey]) for var. *major*. None of these actions resolved the nomenclatural status of *J. californica* relative to var. *major*, nor were any of these statements an effective typification of either name. In addition to the Woodhouse and Thurber gatherings, Watson also had before him at least three or four other elements, (1) a sterile John Torrey collection (*485*, GH!, NY!) from near Santa Barbara, California, gathered in 1865; (2) a William H. Brewer collection with fruit obtained in the "Sierra Santa Monica" of Los Angeles Co., California, in 1860 (GH[2]); and (3) an *A. Kellogg & W.G.W. Harford 902* (30 Apr 1868, GH, NY[2]) collection with only "California" given as a location. Watson also likely had access to an unnumbered and undated Bolander collection labeled "San F." (GH!).

As defined by Watson (1875), the species ranged from "the vicinity of San Francisco … southward to Santa Barbara, Southern Arizona and Sonora." His "San Francisco" reference is almost certainly based on the Bolander and the Kellogg and Harford gatherings; both are in anthesis and are now assigned to *J. hindsii* (Jeps.) Jeps. ex R.E. Sm. (Smith 1909). His reference to Santa Barbara was clearly based on *J. Torrey 485*. The Sonora, Mexico, reference was based on a Thurber specimen (GH!). Curiously, none of these specimens was annotated by Watson. Writing in the work known as "Botany of California," Watson (1880: 93) essentially gave the same distribution that he did in 1875 only this time he added "*Thurber*" without any explanation. It is possible that Watson was aware of

the sheet numbered *702*, gathered in Santa Cruz Valley in 1852, but simply failed to mention this collection of var. *major* when he proposed *J. californica*. Watson probably was not aware of a collection gathered by Charles C. Parry from the San Fernando area near Los Angeles in 1850 (NY!, US!) although a small leaf fragment is at GH!; Parry labeled his US sheet "Juglans rupestris. Eng. var" and wrote "fruit larger, less sculptured than the Texas form." The NY sheet is in flower while the US sheet has fruit. Accordingly, we propose the following lectotype:

***Juglans californica*** S. Watson in Proc. Amer. Acad. Arts 10: 349. Apr 1875. **TYPE: California.** Los Angeles Co.: "Sierra Santa Monica [=Santa Monica Mountains], 1860-1862 [=18 Dec 1860], *W.H. Brewer 65* (lectotype, **designated here**: GH! [bar code no. 00033626]; isolectotypes: GH![frag.], UC! [2 sheets, herb. nos. 5314 and 5319]!, US!).

The Dode (1909: 195) statement "La localité type citée S. Watson, Santa Barbara," which alludes to the Torrey collection, is fortunately not a declaration of a lectotype. The statement by Callahan (2008: 43) that the "type specimen, collected in December 1860 by W.H. Brewer (#65) from Sierra Santa Monica, California, is now stored in Gray Herbarium at Harvard University" was also not an effective lectotypification (Art. 7.11; McNeill et al. 2006) but his suggestion is accepted here.

The geographical range of *Juglans californica* was gradually restricted to just a portion of California (Sargent 1895: 130; Hough 1899: 46; Jepson 1901: 146; Orcutt 1902: 146, 1907: 96). The information was summarized by Jepson (1908), who confined var. *californica* to southern California and established var. *hindsii* Jeps., named for Brinsley Hinds, who found the plant along the Sacramento River in 1846 (K!), for the northern California populations of the Central Valley. This view was basically repeated by Sudworth (1908: 208) and Jepson (1909a: 365, 1909b: 145–147; 1910: 192–196), with Smith (1909: 27) proposing *J. hindsii*, a combination not mentioned by Jepson (1910, 1911) until much later (Jepson 1923: 109, 1924: 69–70, 1925: 279). In fact, the combination was attributed to Sargent (e.g., Babcock 1916) or Rehder (e.g., Sudworth 1927: 50), based on the isonym *J. hindsii* Sarg. ex Rehd. (in L.H. Bailey, Stand. Cycl. Hort. 3: 1722. 1915), even though Smith (e.g., 1912) and others (e.g., Wylie 1920; Pratt 1922: 110) used *J. hindsii* in their publications with Jepson as the authority. Today, *J. hindsii* is generally accepted (Whittemore & Stone 1997) although Wilken (1993: 709) maintained var. *hindsii* in his treatment for the Jepson Manual.

The taxonomic application of *Juglans californica* to a coastal shrub or small tree (up to 15 m tall) of California (Little 1976; Whittemore & Stone 1997; BONAP 2011), and *J. major* for a somewhat larger shrub or tree (up to 18 m tall) found well to the east of *J. californica*, essentially has been unchanged for nearly a century. Our lectotypifications allow the names *J. californica* and *J. major* to remain in current use. Should the two names be combined then *J. californica* has priority. Should one assign var. *major* to *J. microcarpa* then the combinations *J. microcarpa* var. *major* (Torr.) L.D. Benson (1954: 110) and subsp. *major* (Torr.) A.E. Murray (1984: 11) become available.

**Lectotypification of *Juglans microcarpa* Berland.**

The description of *Juglans microcarpa* is at best minimal:

> A la orilla de los torrentes, y sobre todo, en la del arroyo principal, se encuentran nogales de una especie natural, cuyos frutos muy pequeños, parecidos á una grande avellana, tienen un *Endocarpo* muy duro, y por esto se ha descrito bajo el nombre de *Juglans Microcarpa*. [Along the border of the torrents, and mainly, in one of the main streams, are walnuts of a natural species, whose very small fruits, resemble a great hazelnut, they have a very hard *Endocarp*, and for this it has been described under the name of *Juglans Microcarpa*.]

The above is at least diagnostic and not different all that much from Engelmann's characterization of *Juglans nana* ("nuts of the size of a musket ball"—see below) but is sufficient to distinguish this species of walnut from all others in North America. The travels of Berlandier in late 1828 are covered only briefly by McKelvey (1955: 898) but at least a translation of the Berlandier and Chovell's diary is informative (Kaye 2010), so that the 1828 location can be rather precisely stated. Thus, Berlandier's observation of *J. microcarpa* was made along the Frio River west of Utopia in an area known historically as Arroyo de la Soledad until a 1790 battle, when the site was renamed "Cañon de Ugalde" in honor of the Spanish general Juan de Ugalde (1729–1816) who was governor of Coahuila (Wade 2003: 213; Starnes 2011). A collection from this area has not been found, but other Berlandier specimens are extant.

Berlandier's 1851 diary does not mention his later travels in Texas, but certainly his extant specimens (*Berlandier 2459*, GH, NY, PH, US), gathered in 1834, and an undated specimen (*Berlandier 2275*, G, bar code G00305360) were available to him when his diary was published in 1851. Thus, we consider these collections to be original material and available for lectotypification. A critical examination of *Berlandier 2459* shows this to be typical material of *Juglans microcarpa*, but *Berlandier 2275* is a gathering of *J. major*. The latter collection came to Geneva via the 1908 donation of the Moïse-Étienne Moricand herbarium and not directly from Berlandier, whose primary set of specimens is at G (Stafleu & Cowan 1976: 196).

The role of Berlandier in the botany of Texas and the fate of his collections and manuscripts were reviewed in some depth by Geiser (1933; see also McKelvey 1955: 378-381). As a result we propose the *Berlandier 2459* as the type and cite the location and date taken from labels on his specimens. However we must note that the sheet at GH, which consists of a single specimen, bears two labels. One gives the location as Rio de Medina and the date simply as 1834. A second bears the number 1029 with "De Mortamoras a Goliad" and a date of "April 1834." This implies that the collection was gathered somewhere between Matamoras, Tamaulipas, Mexico, and Goliad in Goliad County, Texas. However, this is well out of the known distribution of *Juglans microcarpa*, and thus this label is discounted. We suspect the Berlandier sheets at GH, NY, PH, and US most likely were obtained by Lieutenant D.N. Couch, who purchased "the entire collection of notes and specimens left by Doctor L. Berlandier" when Couch was in Matamoras (Baird 1855: 87).

In a fragment packet on this sheet we also found a letter to Asa Gray, dated 11 Jan 1853, written by Dr. Edward Foreman, assistant to the Secretary Joseph Henry of the Smithsonian Institution. The letter was wrapped around a single walnut.

> Dear Sir:
> An accompanying dried plant has been sent from Austin Texas [so] that is [sic, its] name may be ascertaining, also the little nut. Prof. Henry directs me to send them to you for this [e.g., your identification]. – Also please state in your answer what is the botanical name of the Comal of which we have received seeds.
>
> On my own account I would take the liberty to say that the continuation of your Flora of N. Am. is much wanted & would probably save you many troublesome applications like this present one.

This is all rather confusing. In 1853, Forman was no longer with the Smithsonian but rather had been appointed Chief Examiner for the Patent Office in 1852 and did not return to the Smithsonian until 1874 (Baird 1886: 24). Furthermore, references to both Austin and to Comal strongly suggest the material was gathered by Lindheimer, as "Comal" is the name of the county where Lindheimer lived. Yet, the "dried plant" on the GH sheet is associated with the two Berlandier labels. We believe the nut, specimen, and labels all represent material gathered by Berlandier.

***Juglans microcarpa*** Berland. in J.L. Berlandier and R. Chovell, Diario Viaje Comis. Limites 276. 1850. **TYPE: Texas**. Bexar Co.: Rio de Medina, Jun 1834, *J.L. Berlandier 2459* (lectotype, **designated here**: US!; isolectotype: GH!, NY!, PH!).

*Juglans microcarpa* occurs from north-central New Mexico east to south-central Kansas south through much of central and eastern New Mexico and western Texas into Chihuahua, Coahuila, and Nuevo León, Mexico (Little 1976; Whittemore & Stone 1997; BONAP 2011).

**Lectotypification of *Juglans nana* Engelm.**

When George Engelmann (1851) described this species it was, admittedly, a bit off-handed: "a shrub, that bears nuts of the size of a musket ball." This simple statement is still diagnostic, for Whittemore and Stone (1997: 427) report the nut of this species to be a mere 1.1–1.7 cm in diameter—the smallest nut of any North American species of walnut. Engelmann commented on the "beautiful collections of my friend Ferdinand Lindheimer, together with his very full notes" (p. 223), and wrote a paper read at a session of the American Association for the Advancement of Science on 9 May 1851. That paper was published sometime between late August and December of 1851.

The name *Juglans nana* probably did not originate with Engelmann. In a letter dated 9 October 1846, Lindheimer wrote (as translated) "More fruit specimens of *Juglans nana* will [be] following" (fide, Goyne 1991: 168). Indeed we have seen *Lindheimer 535*, fasc. III found in 1846 (GH!, NY!, PH!, US!). The GH sheet bears an original handwritten label suggesting that the collection was made in May of 1846. We have also seen a September 1845 collection from "the gravelly banks of the upper Guadaloupe [sic] etc." gathered by Lindheimer (GH!) with the name "Juglans fruticosa n sp" on the label. There is also an April 1851 label suggesting that Lindheimer found the plant "on gravelly river banks and in dry creek beds, Guadalup[e]." A third printed label (*Lindheimer 480*, Fasc. III. 1846) is also added to the same sheet; we are uncertain which label goes with which specimen.

A specimen at MO can be associated with this name, namely a Lindheimer collection with a label bearing a printed location ("Comanche Spring: New Braunfels, etc.") stating this is one of the plants "Collected by Lindheimer from 1849 to 1851." Also printed on this label are a collection date ("May 1849") and a collection number ("No. 1178"). Above that label on the MO sheet is what we believe to be Lindheimer's original label. This one is only partially printed ("FLORA TEXANA" [top], "*Hab.*" [lower left], "Ferd. Lindheimer leg. [bottom left], and "18" [bottom right]. In pen is a number "20" (upper left, perhaps Lindheimer's original number), the name "Juglans rupestris?" and in the lower right "May" and "49" after the printed number "18." One of the sheets at GH also bears the number "20" but here the date is given at "April 1849." We consider this to be a lapsis for May. Accordingly we designate a lectotype for *Juglans nana*:

***Juglans nana*** Engelm. in Proc. Amer. Assoc. Advancem. Sci. 5: 226. Aug-Dec 1851. **TYPE: Texas**. Kendall Co.: Comanche Spring, May 1849, *F.J. Lindheimer 1178* (lectotype, **designated here**: MO! [sheet no. 210374]; isolectotype: BM!, GH[2]!, NY, PH[2]!, US!).

*Juglans nana* is a synonym of *J. microcarpa*.

**Lectotypification of *Juglans rupestris* Engelm. ex Torr.**

Wolf (1988: 1630) declared the "type" of *Juglans rupestris* to be the lectotype we have designated here for *J. nana*, in the mistaken belief that Engelmann validated the name. This is not the case. Furthermore there is no evidence that *Lindheimer 1178* was even seen by Torrey (1853: 171) because of what he wrote:

> I first received specimens of this plant from Dr. J. M. Bigelow, when he was attached, as botanists, to the Mexican Boundary Commission, in 1850. He thought it was probably a new species, and wished me, in case it should prove to be undescribed, to name it *J. Whippleana*, in compliment to Lieut. Whipple, who was also a member of the Boundary Commission. Accordingly I read an account of it, under this name, before the American Scientific Association, in August, 1851; but the description was not published. Afterwards I was informed that Dr. Engelmann had obtained the plant before me, and had already named it *J. rupestris*, which name is therefore adopted.

In fact, Engelmann (1851: 226) named the species *Juglans nana*, not *J. rupestris*, and furthermore Torrey's intended paper, entitled "On two new species of *Juglans*," was indeed marked as "Not received" in the summary of the meeting held in Albany, New York (Baird 1852: 307). Torrey wrote in 1853 that he "received from Dr. Woodhouse, and also from Dr. Bigelow, specimens of what I at first took for a second new species of *Juglans*" — this confirms that by 1851 Torrey probably had at least three elements at hand, one or more 1850 Bigelow gatherings from Texas that he considered to represent *J. rupestris*, and two more western specimens of what he termed, in 1853, *J. rupestris* var. *major*. The Bigelow gatherings from western Texas are critical, for today there are two sheets at NY confirming Torrey's use of the word "specimens" in the above quote. One has a handwritten label that states "Juglans Whippleana. Gravelly bed of Stream from Devil's River to the Pecos" (NY, bar code 00214587) while the second has a printed Mexican Boundary Survey label bearing in pen "Juglans rupestris. Engelm. Rio San Pedro (Devil's River). Western Texas. Dr. Bigelow, Oct 1850." The first specimen (which is not dated and lacks a collector's name but almost certainly is a Bigelow collection) lacks mature fruit whereas the second specimen with the printed label has several fruits.

Not mentioned by Torrey, but in his personal herbarium, were two additional collections of *Juglans microcarpa*. One is a Josiah Gregg collection (NY) gathered in Mexico. The second is a Charles Wright collection (NY) but it is not dated; duplicates are at GH! and PH!. Another probable syntype is a Bigelow collection from the "Second Crossing, Devils River" gathered on 3 Nov 1850 (GH!, bar code no. 0003632; NY!). It is possible that this collection is a duplicate of the one Torrey received that was annotated "Juglans Whipplianus" (NY, bar code 00214587). The remark "Second Crossing" and a later date suggest that this is not a duplicate of our lectotype. We have also seen *Wright 363* (May-Oct 1849; GH![2], K!, US!) and *Wright 1863* (1851-1852, US!), both specimens of *J. microcarpa*, and *Wright 1862* (1851-1852, US!), a collection of *J. californica*. A sheet at GH! numbered 1862 bears a label by Wright that states "Limpio Valley – Texas." As none of the Wright material was available to Torrey, none is considered to be original material.

We have also seen a collection numbered *1369* at NY and US (bar code no. 00888534) with a printed label that indicates the material was gathered "chiefly in the Valley of the Rio Grande, below Doñana—by C.C. Parry, M. D., J.M. Bigelow, M. D., Mr. Charles Wright and Mr. A. Schott." This is of *Juglans microcarpa* as well. Since there is no direct evidence that this gathering was seen by Torrey prior to publication of his name, we do not consider these sheets to be original material. No such sheet is at GH.

In view of Torrey's inclusion of characters of both leaves and nuts for *Juglans rupestris* in his protologue, and of his specific reference to Bigelow, we hereby designate the following lectotype:

***Juglans rupestris*** Engelm. ex Torr. in L. Sitgreaves, Rep. Exped. Zuni & Colorado Rivers 171, pl. 15. Mar-Apr 1853. **TYPE**: **Texas**. Val Verde Co.: Rio San Pedro (Devil's River), Oct 1850, *J.M. Bigelow s.n.* (lectotype, **designated here**: NY! [bar code no. 00214586]; isolectotype: NY![bar code 00214587].

*Juglans rupestris* is a synonym of *J. microcarpa.*

**Lectotypification of two Dode (1909) names in *Juglans***

Dode (1907; 1909: 191–195) proposed five names now considered to be synonyms of *Juglans microcarpa* or *J. major* (Manning 1957: 136–140). Mauz (2011: 128) noted that the holotype of *J. arizonica* Dode (1909: 169, 193) is a *C.G. Pringle s.n.* collection from the Santa Rita Mountains of Pima or Santa Cruz County, Arizona, gathered on 11 Jun 1884 (holotype: P! [bar code P005065583]; isotypes CM!, F!, NY/WAB!, PH!, US! = *J. major*). She also designated a lectotype for *J. elaeopyren* Dode (1907: 247), namely another unnumbered Pringle collection, this one from the Santa Catalina Mountains of Pima Co., Arizona, obtained on 17 May 1881 (lectotype: G![bar code 103606/1]; isolectotypes: A!, ARIZ!, CM!, F!, G![3], GH!, MO!, NY!, PH!, US[2]! = *J. major*, fide LaFerrière 1994: 219).

We can now report on a third species:

***Juglans subrupestris*** Dode. Bull. Soc. Dendrol. France 13: 169, 191. 15 Aug 1909. **TYPE: Texas.** Without location, 1847, *F.J. Lindheimer 704* (holotype not found; isotypes: GH![2], K!, NY!; US[2]! = *J. microcarpa*)

A sheet seen and annotated as *Juglans subrupestris* by Dode, and therefore the probable holotype, might be at P. At the moment, specimens of *Juglans* are not available due to ongoing renovations (P.P. Lowry, pers. comm.). Curiously, this collection is not at MO (Blankinship 1911: 155). The plant could have been collected near present-day Llano, Llano Co., Texas, where Lindheimer resided for at least part of 1847 (Goyne 1991; 180) or more likely it was gathered in the Fredericksburg area near the Pedernales River in Gillespie Co. (Geiser 1937: 170; McKelvey 1955: 903), where the walnut is found today.

Lectotypes are required for the following two names proposed by Dode:

***Juglans neomexicana*** Dode, Bull. Soc. Dendrol. France 13: 169, 191. 15 Aug 1909. **TYPE: New Mexico**. Lincoln Co.: White Mts., 19 Aug 1897, *E.O. Wooton 362* (lectotype, **designated here**: P! [bar code no. P00506584]; isolectotype: NY!, P! [bar code no. P00506585], RM!, US!. = *J. microcarpa*).

Our designation of the Wooton specimen allows *Juglans neomexicana* to remain a synonym of *J. microcarpa* as the other syntype (Arizona, Coconino Co.: near Flagstaff, 12 Jul 1898, *D.T. MacDougal 271*, GH!, NY!, NY/DPU!, PH!, US!) is a collection of *J. major* and, obviously, not from New Mexico.

***Juglans torreyi*** Dode, Bull. Soc. Dendrol. France 13: 169, 194. 15 Aug 1909. **LECTOTYPE, designated here**: C.S. Sargent, Silva N. Amer. 7: t. CCCXXXVI. 1 Feb 1895. = *J. major*).

Dode (1909: 194–195) did not accept *Juglans rupestris* or *J. major*, treating both as pro parte names of *J. californica* and *J. torreyi* for reasons not entirely true:

> Sous le nom de *J. rupestris* β *major*, Torrey n'entendait pas seulement l'espèce qu'il a figurée (*loc. cit.* [e.g., C.S. Sargent, Silva N. Amer. 7: t. CCCXXXVI. 1 Feb 1895]) et dont il s'agit ici, mais aussi *J. californica*. Lorsque ce dernier a été spécifiquement 'etabli, la synonymie *J. rupestris major* a été donnée, non sans raison. Le caractère des anthers pubescentes (non encore signalé, croyons-nous) suffit à le séparer facilement de *J. rupestris* et de *J.*

> *californica*. [Under the name *J. rupestris* β *major*, Torrey not only treated the species in question here, but also *J. californica*. When the latter was established, the synonym *J. rupestris major* was given without reason. The character of the pubescent anthers (not yet reported, we believe) is enough to easily separate it [*J. torreyi*] from *J. rupestris* and *J. californica*.]

As mentioned above, Torrey (1853: 171) alluded to only two collections under his var. *major*. Six years later, also as mentioned above, Torrey (1859: 205) considered the Bigelow collection to be an expression of var. *rupestris* rather than var. *major*. At no time did Torrey ever allude to any element of *J. californica*. Clearly, Dode confused Torrey's efforts with what Watson did more than two decades later. Given the nature of the name and the distribution of *J. torreyi* and the citation of the 1895 Sargent plate, the lectotype of *J. rupestris* var. *major* clearly falls within *J. torreyi*. By lectotypifying Dode's name on the cited Sargent plate, *J. torreyi* is at least legitimate while the question of whether or not this name was superfluous when published is left unresolved. Manning (1957: 138) suggested that this name was "based on plants cultivated in France" as Dode (1909: 195) mentioned "Cultivé: ALLARD, Angers (fructifiant)," but our choice of a lectotype ensures application of the name.

## ACKNOWLEDGEMENTS

This work was done during a course on botanical nomenclature at Cornell University (BIOPL 6540). We are grateful to members of the L.H. Bailey Hortorium for their help and the support by the Department in making publication possible. We wish to acknowledge especially the assistance of Kanchi Gandhi (GH), Werner Greuter (B), and John McNeill (E). The assistance of Porter P. Lowry II (MO, P) and Kathryn Mauz (ARIZ) is acknowledged. Finally, this effort could not have been done without the assistance of numerous curators for which we are grateful.

## LITERATURE CITED

Babcock, E.B. 1916. Studies in *Juglans*. III. (1) Further evidence that the oak-like walnut originates by mutation; (2) A parallel mutation in *Juglans hindsii* (Jepson) Sargent. Univ. Calif. Publ. Agric. Sci. 2: 71–80.

Baird, S. 1852. D. Natural history, including physiology. Proc. Amer. Assoc. Advancem. Sci. 6: 307–374.

Baird, S. 1855. Report on American explorations in the years 1853 and 1854. Smithsonian Inst. Ann. Rep. 9: 79–87.

Baird, S. 1886. Report of Professor Baird. Secretary of the Smithsonian Institution, for 1885. Ann. Rep. Board Regents Smithsonian Inst. 1: 1–46.

Benson, L.D. 1954. *Juglans microcarpa*. Pp. 110, 414, *in* L.D. Benson and R.A. Darrow. Trees and Shrubs of the Southwestern Deserts. Univ. of Arizona Press, Tucson.

Berlandier, J.L. 1850. Caza del Oso y Cibolo el N. O. de Tejas. Pp. 249-282, *in* J.L. Berlandier & R. Chovell, Diario de viage de la Comisión de Límites que puso el gobierno de la república, bajo la dirección del exmo. Sr. general de división D. Manuel de Mier y Terán. J.R. Navarro, Mexico City.

Blankinship, J.W. 1907. Plantae lindheimerianae. Part III. Missouri Bot. Gard. Ann. Rep. 1907: 123–223.

BONAP [Biota of North America Program]. 2011. North American Plant Atlas (NAPA) (US county-level species maps). Biota of North America Program, Chapel Hill, North Carolina. <http://www.bonap.org/genera-list.html> Accessed 28 November 2011.

Callahan, F. 2008. Hinds walnut (*Juglans hindsii*) in Oregon. Kalmiopsis 15: 42–52.

Cullina, W. 2002. Native Trees, Shrubs, & Vines: A Guide To Using, Growing and Propagating North American Woody Plants. Frances Tenebaum Books, Houghton, Mifflin, Harcourt, Boston.

Dode, L.A. 1907. Contribution de l'etude du genre *Juglans*. Bull. Herb. Boissier, ser. 2, 7: 247–248. 1907.
Dode, L.A. 1909. Contribution de l'etude du genre *Juglans*. Bull. Soc. Dendrol. France 13: 165–215.
Engelmann, G. 1851. On the character of the vegetation of south western Texas. Proc. Amer. Assoc. Advancem. Sci. 5: 223–228.
Fralish, J.S. and S.B. Franklin. 2002. Taxonomy and ecology of woody plants in North American forests (excluding Mexico and subtropical Florida). Wiley, New York.
Geiser, S.W. 1937. Naturalists on the frontier. University Press, Dallas, Texas.
Goyne, M.A. 1991. A life among the Texas flora. Texas A & M Univ. Press, College Station.
Harker, D., G. Libby, K. Harker, S. Evans, and M. Evans. 1999. Landscape restoration handbook (ed. 2). Lewis Press for CRC Press, Danvers, Massachusetts.
Heller, A.A. 1904. Western species, new and old.—II. Muhlenbergia 1: 47–62. 1904.
Hickman, J.C. (ed.). 1993. The Jepson Manual: Higher Plants of California. Univ. of California Press, Berkeley.
Hough, R.B. 1899. American Woods, Exhibited by Actual Specimens and With Copious Explanatory Text. Part. VIII. Representing twenty-five species by twenty-five sets of sections. Published by the author, Lowville, New York.
Jepson, W.L. 1901. A Flora of Western Middle California. Encina Publ. Co., Berkeley.
Jepson, W.L. 1908. The distribution of *Juglans californica* Wats[.] Bull. S. Calif. Acad. Sci. 7: 23–24.
Jepson, W.L. 1909a. Juglandaceae. Fl. Calif. 1: 365.
Jepson, W.L. 1909b. The Trees of California. Cunningham, Curtiss & Welch, San Francisco.
Jepson, W.L. 1910. The silva of California. Mem. Univ. Calif. 2: 1–480.
Jepson, W.L. 1911. A Flora of Western Middle California (ed. 2). Cunningham, Curtiss & Welch, San Francisco.
Jepson, W.L. 1923. The Trees of California (ed. 2). Cunningham, Curtiss & Welch, San Francisco.
Jepson, W.L. 1924. Economic Plants of California. Associated Students Store, Berkeley.
Jepson, W.L. 1925. A Manual of the Flowering Plants of California. Sather Gate Bookshop, Berkeley.
Johnson, T. 1999. CRC Ethnobotany Desk Reference. CRC Press, Boca Raton, Florida.
Johnston, I.M. 1924. A neglected paper by Jean Louis Berlandier. Contr. Gray Herb. 70: 87–90.
Johnston, I.M. 1944. Plants of Coahuila, eastern Chihuahua, and adjoining Zacatecas and Durango, IV. J. Arnold Arbor. 25: 431–453.
Kaye, J. 2010. Berlandier: A French Naturalist on the Texas Frontier. Trafford Publ., Bloomington, Indiana.
Kearney, T.H. and R.H. Peebles. 1951. Arizona Flora. Univ. of California Press, Berkeley.
Laferrière, J.E. 1994. Juglandaceae Walnut family. J. Arizona-Nevada Acad. Sci. 27: 219.
Little, E.L., Jr. 1977. Atlas of United States Trees, Vol. 3, Minor Western hardwoods. U.S. Dept. Agric. Misc. Publ. 1314: 1–13 + 290 maps.
Manning, W.E. 1957. The genus *Juglans* in Mexico and Central America. J. Arnold Arbor. 38: 121–150.
Martin, W.C. and C.R. Hutchins. 1980. A Flora of New Mexico. 2 vols. J. Cramer, Vaduz.
Mauz, K. 2011. Cyrus Pringle's vascular plant types from western United States and Mexico, 1881–1884. Harvard Pap. Bot. 16: 71–141.
McKelvey, S.D. 1955. Botanical Exploration of the Trans-Mississippi West. Arnold Arboretum of Harvard University, Jamaica Plain, Massachusetts.
McNeill, J., F.M. Barrie, H.M. Burdet, V. Demoulin, D.L. Hawksworth, K. Marhold, D.H. Nicolson, J. Prado, P.C. Silva, J.E. Skog, J.H. Wiersema, and N.J. Turland (eds.). 2006. International Code of Botanical Nomenclature (Vienna Code) adopted by the Seventeenth International Botanical Congress Vienna, Austria, July 2005. GantnerVerlag, Ruggell, Liechtenstein.

Moerman, D.E. 2010. Native American Food Plants: An Ethnobotanical Dictionary. The food uses of more than 1500 plants by 221 Native American groups. Timber Press, Portland, Oregon.
Murray, A.E. 1984. Notae spermatophytae (Spermatophytea notes). Kalmia 12: 21–27.
Munz, P.A. 1974. A Flora of Southern California. Univ. of California Press, Berkeley.
Nagy, L. von. 1886. Neue Gehölze. Wiener. Ill. Gart.-Zeitung 8/9: 382-384.
Orcutt, C.R. 1902. Juglandaceae. Calif. Art Nat. 1: 146. 1902.
Orcutt, C.R. 1907. American Plants. Volume One. Published by the author, San Diego.
Parish, S.B. 1894. Distribution of southern California trees. Zoe 4: 332–353.
Peter, A. 1876. Zusammenstellung der neuen und kritisch besprochenen Arten und Varietäten der Phanerogamen. Just's Bot. Jahresber 4(2): 1308–1400.
Pratt, M.B. 1922. Shade and Ornamental Trees of California. Sacramento: State Board of Forestry.
Preston, R.J., Jr. and R.R. Braham. 2002. North American Trees (ed. 5). Iowa State Press, Ames.
Rothrock, J.T. 1879. Catalogue of plants collected in Nevada, Utah, Colorado, New Mexico, and Arizona with descriptions of those not contained in Gray's Manual of the Northern U.S., and Vol. V, Geological Explorations of the Fortieth Parallel. Pp. 53–404, pl. 1–30, *in* Report upon United States geographical surveys west of the one hundredth meridian, in charge of first lieut. Geo. M. Wheeler. Government Printing Office, Washington.
Sargent, C.S. 1880. A Catalogue of the Forest Trees of North America. Pp. 1–93, *in* Department of the Interior. Tenth Census of the United States. Forestry. Government Printing Office, Washington.
Sargent, C.S. 1884. Report on the Forests of North America (Exclusive of Mexico). Pp. i–ix + 1–612, *in* Department of the Interior. Census Office. House of Representative Document 42, part 9. Government Printing Office, Washington.
Sargent, C.S. 1895. The Silva of North America. Volume 7. Lauraceae–Juglandaceae. Houghton, Mifflin & Co., Boston.
Smith, R.E. 1909. Report of the plant pathologist and superintendent of southern California stations. Univ. Calif. Agric. Exp. Sta. Bull. 203: 5–63.
Smith, R.E., C.O. Smith, and H.J. Ramsey. 1912. Walnut culture in California: walnut blight. Univ. Calif. Agric. Exp. Sta. Bull. 231: 119–398.
Starnes, G.B. 2011. Ugalde, Juan de. Handbook of Texas Online. <http://www.tshaonline.org/handbook/online/articles/fug01>, accessed 25 Nov 2011.
Stafleu, F.A. and R.S. Cowan. 1976. Taxonomic Literature. A Selective Guide to Botanical Publications and Collections With Dates, Commentaries and Types. Volume 1: A – G. Regnum Veget. 94: xl, 1–1136.
Sudworth, G.B. 1908. Forest Trees of the Pacific Slope. Government Printing Office, Washington.
Sudworth, G.B. 1927. Check list of the Forest Trees of the United States: Their Names and Ranges. Government Printing Office, Washington.
Thompson, R.S., K.H. Anderson, L.E. Strickland, S.L. Shafer, R.T. Pelltier, and P.J. Bartlein. 2006. Atlas of relations between climatic parameters and distributions of important trees and shrubs in North America—Alaska species and ecoregions. U.S. Geol. Surv. Prof. Pap. 1650-D: 1–342.
Torrey, J. 1853. Botany. Pp. 153 –178, pl. 1 –21, *in* L. Sitgreaves. Report of an Expedition Down to the Zuni and Colorado Rivers. Robert Armstrong, Washington.
Torrey, J. 1859. Botany of the Boundary. Rep. U.S. Mex. Bound. 2(1): 27–270, pl. 1–61.
Wade, M. de Fátima. 2003. The Native Americans of the Texas Edwards Plateau, 1582–1799. Univ. of Texas Press, Austin.
Watson, S. 1875. Revision of the genus *Ceanothus* and descriptions of new plants with a synopsis of the western species of *Silene*. Proc. Amer. Acad. Arts 10: 333–350.
Watson, S. 1880. Botany. Volume II. Pp. xvi + 559, *in* J.D. Whitney. Geological survey of California. John Wilson & Son, Univ. Press, Cambridge.
Whittemore, A.T. and D.E. Stone. 1997. Juglans. Fl. N. Amer. 3: 425–428.

Wilken, D.H. 1993. Juglandaceae. Pp. 709, *in* J.C. Hickman (ed.). The Jepson Manual: Higher Plants of California. Univ. of California Press, Berkeley.

Wolf, S.J. 1988. George Engelmann type specimens in the herbarium of the Missouri Botanical Garden. Ann. Missouri Bot. Gard. 75: 1608–1636.

Wooton, E.O. and P.C. Standley. 1915. Flora of New Mexico. Contr. U.S. Natl. Herb. 19: 1–794.

Wylie, D.C. 1920. Heavy walnut planting. Amer. Nut J. 12: 77.